

Financing Africa's infrastructure deficit: From development banking to long-term investing

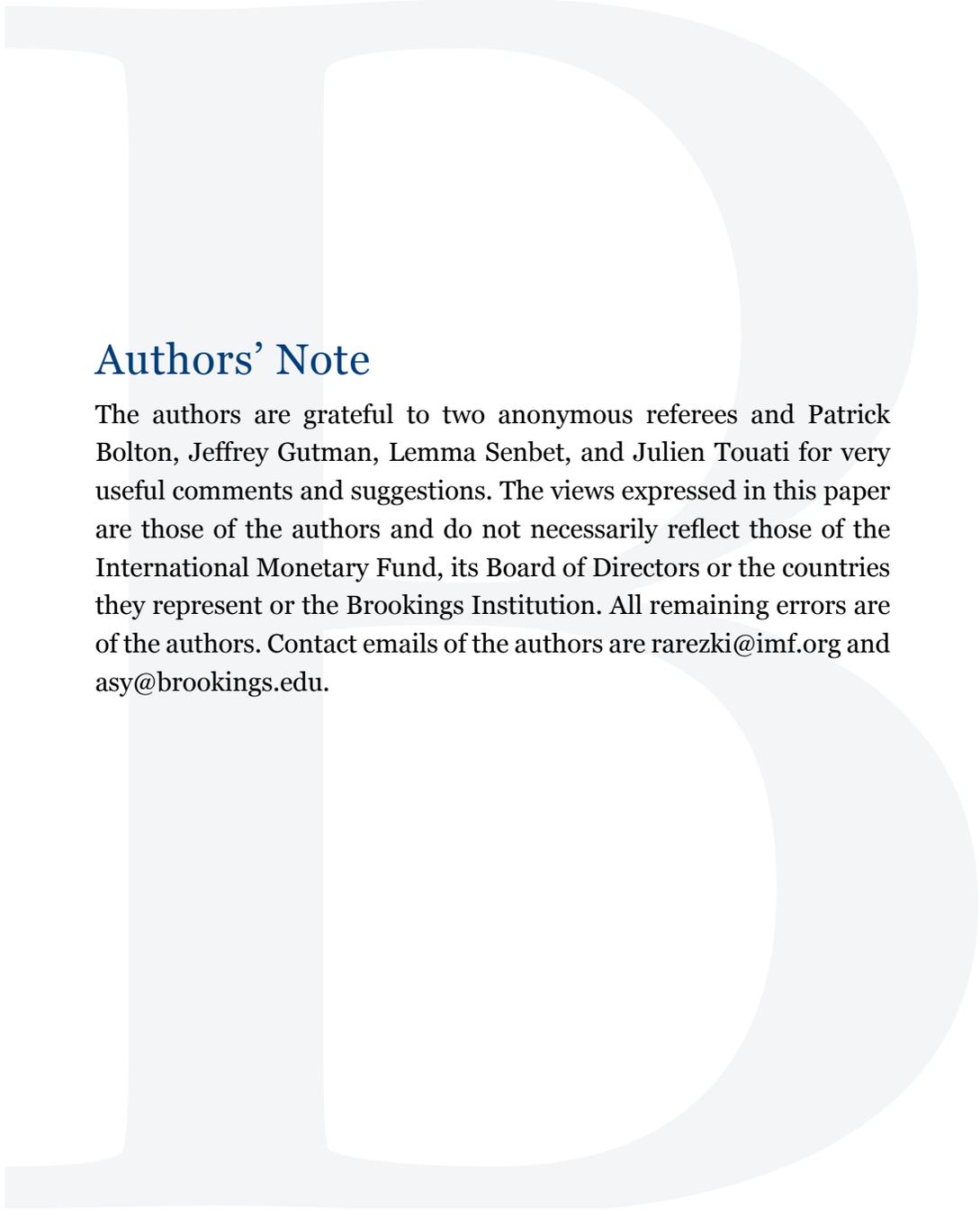
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Authors' Note

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Abstract

This paper studies the appropriate financing structure of infrastructure investment in Africa. It starts with a description of recent initiatives to scale up infrastructure investment in Africa. The paper then uses insights from the literature on informed versus arm's length debt to discuss the structure of infrastructure financing. Considering the differences in investors' preferences that Africa faces, the paper argues that continent's success to fill its greenfield and, hence, risky infrastructure gap is a delicate balancing act between development banking and institutional long-term investment. In a first phase, development banks that have both the flexibility and expertise should help finance the riskier phases of large greenfield infrastructure projects. In a second phase, development banks should disengage and offload their mature brownfield projects to pave the way for a viable engagement of long-term institutional investors such as sovereign wealth funds. In order to promote an Africa-wide infrastructure bond market where the latter could play a critical role, the enhancement of Africa's legal and regulatory framework should, however, start now.

Keywords: Africa, Infrastructure Finance, Development Banks, Long-term Investors.

JEL Classification: H49, H54, G30, G38

I. Introduction

Africa is the continent of the future. To realize its potential, Africa needs to reduce its massive infrastructure deficit to both achieve structural transformation and market integration. Africa is, however, constrained by its limited domestic revenue base and thus needs to tap into foreign finances. While progress has been made on the origination of large regional infrastructure projects, the needed scaling up of financing infrastructure has not yet materialized. While research on the incentive issues in a context of public-private partnership has been prolific, little attention has been paid to the appropriate structure of financing of infrastructure investment in developing countries, and in Africa in particular. This paper fills that gap.

From the perspective of investors, including long-term investors such as sovereign wealth funds (SWFs), investing part of their assets in infrastructure would provide them with the obvious benefit of portfolio diversification while helping achieve their risk-adjusted return objectives. Long-term investors such as SWFs constitute a pool of savings that can help alleviate the financing constraints of Africa's infrastructure. SWFs as a class of institutional investors have gained prominence over the last decade, mainly as a result of the rapid rise of their assets under management (AUM). To date, SWFs have accumulated nearly \$6 trillion in assets, and if one adds to this number the reserves accumulated by central banks, total accumulated savings in this sector approach \$15 trillion. One can grasp the enormous size of this global sovereign wealth by comparing it, for example, to U.S. nominal GDP (\$16.6 trillion in 2012), or to the IMF's new arrangements to borrow (\$576 billion in 2013), or even to the total market capitalization of U.S.-listed companies (\$18.7 trillion in 2012). In addition to their relatively large size, SWFs have long investment horizons and are relatively much better placed to invest in long-term global infrastructure assets than most investors. In the infrastructure asset class, where there is a huge demand for funding, SWFs are likely to face less competition.¹ One major reason SWFs are in a better position to invest in such long-term assets is that, unlike other traditional long-term investors such as pension funds, most SWFs do not have substantial explicit liabilities. They are also not subject to the "prudent person" investment regulations, which prevent other institutional investors such as pension funds from building a large exposure to long-term infrastructure projects.

While the case for SWFs and other long-term investors to invest in infrastructure-based assets is strong, the modalities of such a shift in their asset allocation, especially toward Africa-based infrastructure assets, constitute a real challenge. Indeed, the asset allocation toward infrastructure by SWFs has been very modest thus far. According to TheCityUK (2013), SWFs have invested solely \$26 billion of their assets under management into infrastructure assets. SWFs differ widely in terms of their objective and their asset allocation. Notable exceptions of SWFs investing significantly in infrastructure are Singapore's Temasek and the United Arab Emirates' Mubadala.

A few major global pension funds also invest noticeably in infrastructure assets such as the Canadian Pension Plan, which invests about 5.7 percent of its total assets.² Existing evidence for African countries suggests that pension assets are relatively small and dominated by often poorly performing pay-as-you-go (PAYG) schemes for public sector employees. Notable exceptions include countries in southern Africa such as Botswana, Namibia, and South Africa, and a few others such as Kenya and Nigeria. However, even when pension reforms toward fully funded systems have been implemented (like in Nigeria), and assets are available for investment, governance and regulatory obstacles as well as a dearth of adequate financial instruments limit African pension funds' allocation to infrastructure.

More generally, there are three main challenges for SWFs and other long-term investors contemplating investing in infrastructure assets. First, investment in infrastructure entails different types of risk compared to other asset classes. For example, the construction risks inherent in large-scale infrastructure can deter long-term investors whose propensity to take risks is relatively low considering their main objective, which is to preserve wealth. Second, SWFs and other long-term investors lack in-house expertise specific to infrastructure. At times, it is even crucial to possess the adequate expertise on infrastructure at the sectoral level (for instance, transportation, energy, information and communication technology, or water). OECD (2014a) stresses that more expertise at the level of board members will be required, perhaps including specialists that have appropriate asset and risk management skills.³ Third, the lack of standardization of underlying infrastructure projects is an important impediment to the scaling up of investment into infrastructure-based assets. Large physical infrastructure projects are indeed complex and can differ widely from one country and from one sector to the next.

For these reasons, banks and, in particular, development banks and multilateral development banks (MDBs) that have expertise in infrastructure and flexibility in terms of investment horizon and contract renegotiation may play a key role in paving the way for a viable engagement of institutional investors. In addition, MDBs' claims on the governments that receive their loans are senior to other claims. MDBs indeed possess unique characteristics in providing finance that is related to the design and implementation of structural reforms and institution-building programs adopted by governments. The (credible) commitment of governments to the policy reforms and changes in government practices embodied in MDB conditionality and their monitoring and enforcement measures are fundamental to MDB operations and differentiate them from private lenders. Importantly, the advent of infrastructure investment platforms (see Arezki et al., 2016) has further extended the practice of co-financing whereby MDBs and private lenders join forces to support infrastructure investments. Indeed, Arredáriz de Aghion (1999) shows that the provision by MDBs of well-targeted guarantees (or subsidies) alongside the use of co-financing (limiting the opportunities for politically motivated credit allocation) can lead to superior outcomes.

Among the international efforts to leverage institutional investment for infrastructure and other long-term investment, the G-20-OECD High-Level Principles of Long-Term Investment Financing by Institutional Investors aim at facilitating and promoting long-term investment by institutional investors, including pension funds.⁴ In particular, the principles seek to help policymakers design a policy and regulatory framework that encourages institutional investors to invest in long-term assets in a manner consistent with their investment horizon and risk-return objectives.

This paper relates to the economics literature on public-private partnerships (PPP) (see Iossa and Martimort, 2015 for an overview). One of the central insights of that prolific literature is that it is generally incentive-efficient to structure concession contracts by bundling construction and service-provisions together with a single private operator. The reason bundling is efficient is that by assigning construction and operation to the same provider, the latter has strong incentives to construct the facility so as to minimize future operating costs. Besides the focus on incentives issues, it is striking how little attention the economics literature has devoted to the fundamental question of how to structure financing of infrastructure investments including under PPPs.

This paper also relates to a strand of the finance literature on informed versus arm's length debt (see, for instance, Rajan, 1992). The main insight from that literature is that banks have the capacity to provide cheap "informed" funds as opposed to costly "uninformed" or arm's length funds. There are, however, costs associated to utilizing bank debt because of informational capture. Considering the costs associated with the reliance on informed and flexible lenders at the earlier stage of infrastructure projects, this paper draws insights from the above-mentioned literature to reflect on the appropriate financing structure for infrastructure.

In this paper, we first take stock of recent initiatives to scale up infrastructure in Africa through the construction of new (greenfield) investment. While progress has been made on the origination front, especially for regional infrastructure investment, the financing has yet to materialize. The paper then critically reviews the literature on informed versus arm's length debt and draws lessons for infrastructure financing. Considering the differences in investors' preferences that Africa faces, the paper argues that Africa's success to fill its greenfield infrastructure gap hinges upon a delicate balancing act between development banking and long-term institutional investing. First, a greater involvement of development banks that have both the flexibility and expertise will help finance the riskier phases of large infrastructure projects. Second, development banks should disengage and offload their mature investments that generate a stable and well-identified stream of revenue to pave the way for a viable engagement of long term institutional investors such as sovereign wealth funds. In order to promote an Africa-wide infrastructure bond market where the latter could play a critical role, the enhancement of Africa's legal and regulatory framework should start now. Provided they uphold the highest standards, greater involvement of development banks could help with the diffusion of best practices and hence reduce substantial efficiency gaps prevailing in existing infrastructure spending.

The remainder of the paper is organized as follows. Section II presents recent developments in infrastructure in Africa. Section III critically reviews the literature on informed versus arm's length debt. Section IV discusses the delicate balancing act between development banking and long-term institutional investing. Section V concludes.

II. Recent developments in infrastructure finance in Africa⁵

To provide some context for our subsequent discussion on the appropriate sequencing and structure of financing of infrastructure in Africa, we present some evidence on the current landscape of Africa's infrastructure as well as recent initiatives to scale up investment.

A. Africa's infrastructure

Africa's infrastructure deficit is large. A World Bank (2009) report estimates that sub-Saharan Africa's needs amount to \$93 billion per year, and the region's infrastructure networks have increasingly been lagging behind those of other developing countries. Africa's geography presents a particular challenge for infrastructure development. Services are twice as expensive as elsewhere, reflecting diseconomies of scale in production and high profit margins due to lack of competition. Power is by far sub-Saharan Africa's largest infrastructure challenge, with 30 countries facing regular power shortages.

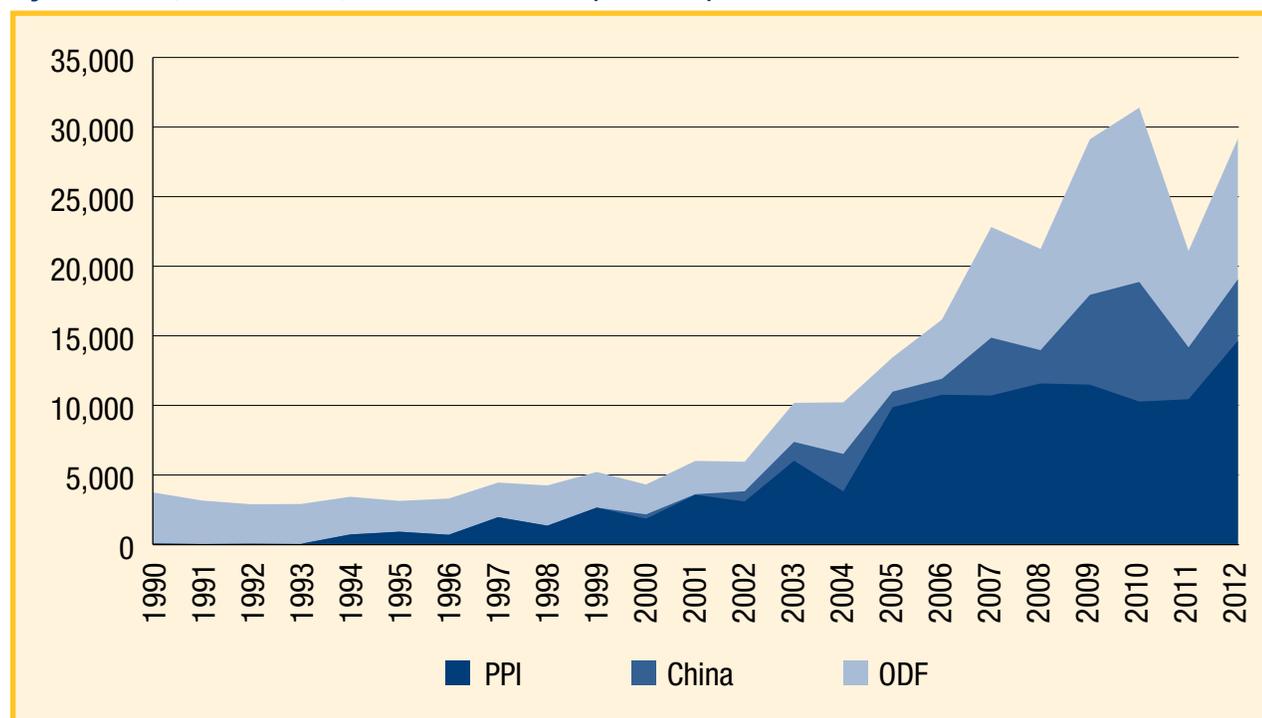
Table 1: Infrastructure deficit in sub-Saharan Africa

Normalized units	Sub-Saharan Africa low-income countries	Other low-income countries
Roads		
Paved-road density	31	134
Total road density	137	211
Telecommunications		
Main-line density	10	78
Mobile density	55	76
Internet density	2	3
Electricity		
Generation capacity	37	326
Electricity coverage	16	41
Water and sanitation		
Improved water	60	72
Improved sanitation	34	51

Source: Yepes, Pierce, and Foster (2008) and reproduced in Foster and Briceño-Garmendia (2009: 1-2).
Note: Road density is measured in kilometers per 100 square kilometers of arable land; telephone density in lines per thousand population; generation capacity in megawatts per million population; electricity, water, and sanitation coverage in percentage of population with access to services.

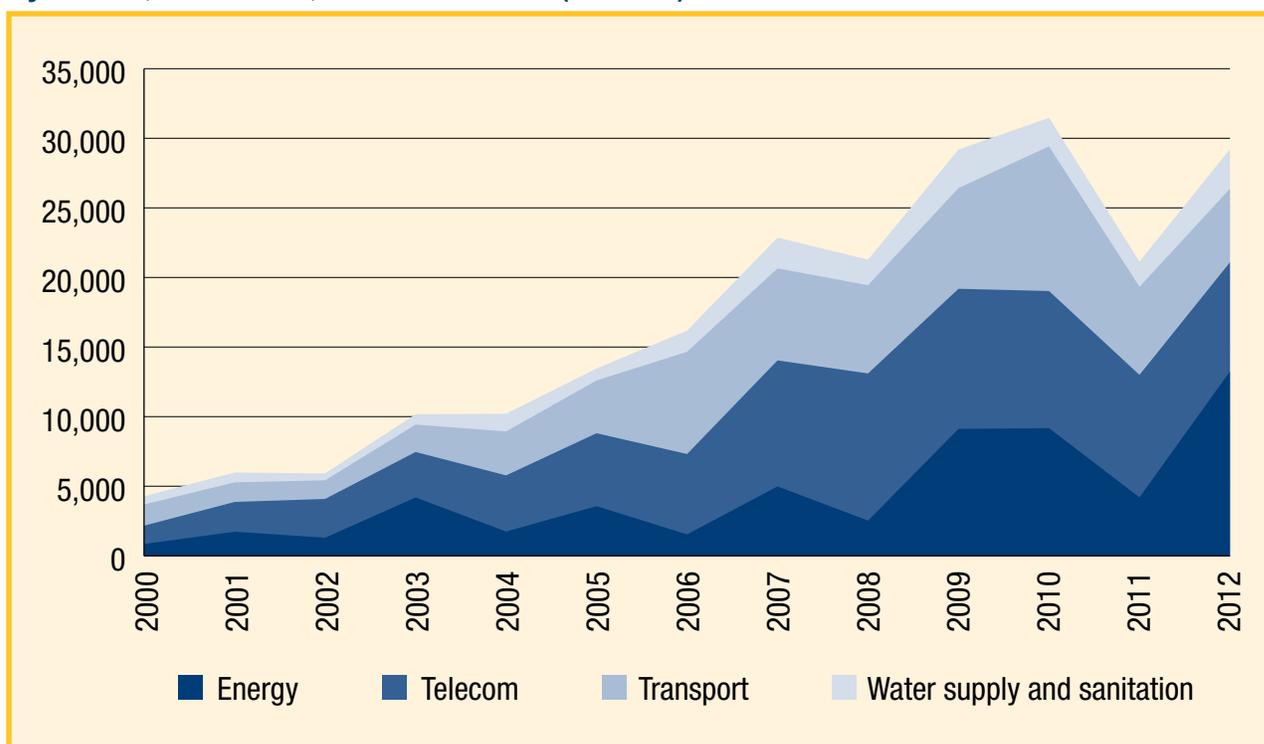
Public finance continues to be the major source of funding for infrastructure in sub-Saharan Africa. There has been an increase in infrastructure funding as a number of countries dedicate more than 5-6 percent of GDP to infrastructure investment. Private sector finance, which had been rather broad-based across countries when directed at telecom sector investments, is highly concentrated in a more limited number of countries when directed at other sectors, especially energy. In parallel, China's considerable financing supports countries and sectors—such as road and rail—that are not targeted by the private sector. Official development finance (ODF), especially from the World Bank and the African Development Bank (AFDB), continues to represent an important source of finance with a broad country distribution guided by the allocation criteria for their most concessional window (International Development Association/African Development Fund).

Figure 1: External infrastructure investment commitments in sub-Saharan Africa, by sources, 1990-2012, in US\$ millions (current)



Source: Gutman, Sy, and Chattopadhyay (2015)

Figure 2: External infrastructure investment commitments in sub-Saharan Africa, by sector, 2000-2012, in US\$ millions (current)



Source: Gutman, Sy, and Chattopadhyay (2015)

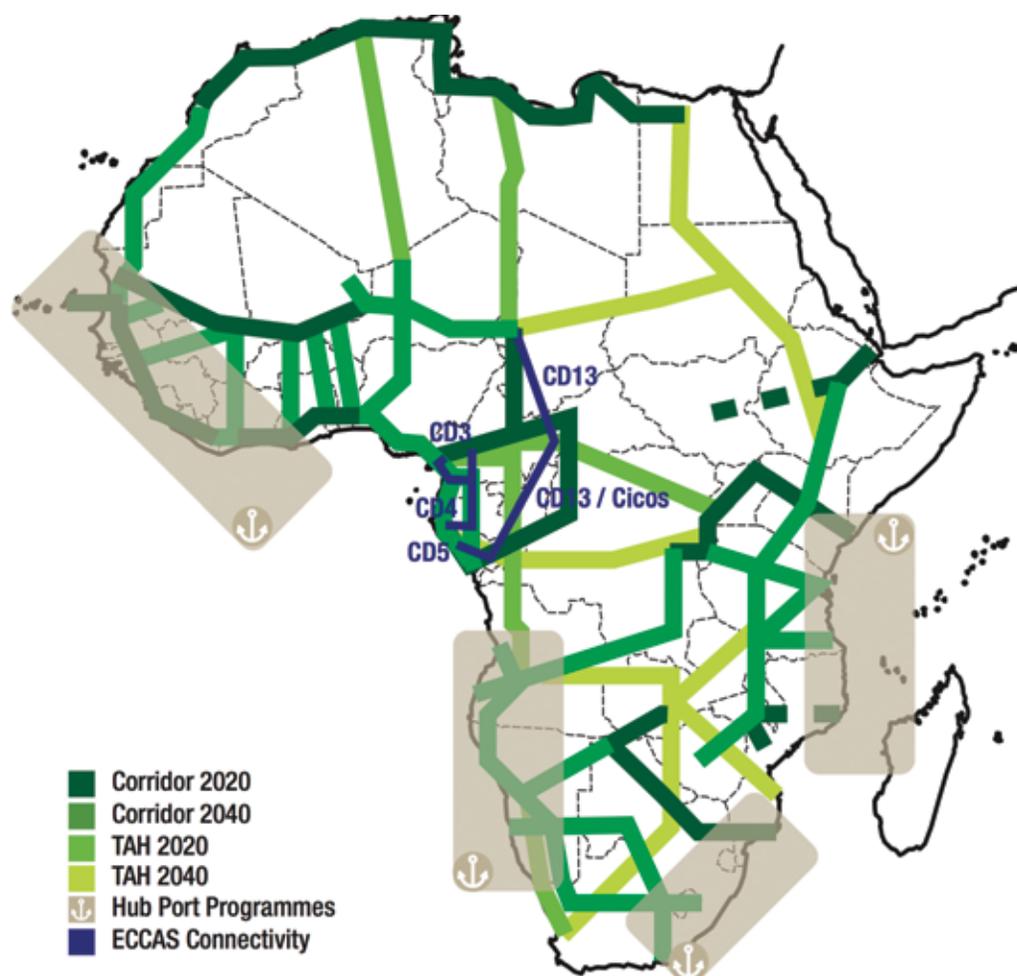
B. New initiatives to scale up Africa’s infrastructure

The necessity to reduce Africa’s infrastructure deficit in Africa has led to a proliferation of initiatives. Among those, the most ambitious for Africa is the Program for Infrastructure Development in Africa (PIDA)⁶ established in 2001 under the African Union (AU) and supported by the New Partnership for Africa’s Development (NEPAD),⁷ in 2011 as one of its flagship initiatives to identify and assess key cross-border infrastructure investments over the period 2012-2040. In 2002, the NEPAD formulated a short-term action plan to address the massive shortage of required investments for infrastructure development in African countries by advocating greater coordination and commitment towards regional economic integration. This was followed up in 2005, by G-8 countries setting up the Infrastructure Consortium for Africa (ICA), primarily to generate greater financial commitment from member countries and other leading development finance institutions. The AfDB meanwhile provides further support to the measures taken by NEPAD’s Infrastructure Project Preparation Facility (IPPF) and PIDA. The AfDB carries out this task through publishing annual reports and facilitating regular meetings with G-20 member countries, major multilateral institutions, the Private Infrastructure Development Group (PIDG) and the Pan-African Infrastructure Development Fund.

PIDA's main strategy lies into building transport corridors to foster economic development through enhancing economic integration. These corridors are gateways to landlocked countries (16 countries out of 54) and aim at connecting local firms to international and regional markets. They are expected to reduce transport costs, which represent 30 percent of value in African exports, compared to 8.6 percent of developing countries'. The corridors will also help promote harmonized and integrated multi-modal transport (roads, railways, airlines, and ports/maritime transport). Under the new African Development Bank's Strategy for 2013-2022, key corridor support includes a dozen corridors, as shown in the map below.⁸

PIDA is an ambitious program, but appears affordable. The total cost of PIDA is \$360 billion by 2040, with significant impact. The priority action plan (PAP) 2020 contains the first set of immediate priorities: 51 projects and programs. Overall capital cost of delivering the PAP amounts to nearly \$68 billion, or about \$7.5 billion annually (far below 1 percent of African GDP).

Figure 3: PIDA – Transport networks 2020 & 2040



Source: Program for Infrastructure Development in Africa in *Interconnecting, integrating and transforming a continent*.

Selected initiatives to scale up African infrastructure

In addition to PIDA:

- The World Bank, in partnership with the AfDB, developed the Africa Infrastructure Country Diagnostic (AICD), which provided a detailed series of infrastructure investment needs by sub-region in 2011.⁹
- The G-8 Summit at Gleneagles in 2005 established the Infrastructure Consortium for Africa (ICA) to promote public and private investment in infrastructure.¹⁰ Its members include the G-8 member countries, the World Bank, the AfDB, the European Commission, the European Investment Bank, and the Development Bank of South Africa. Its secretariat is situated in the AfDB and publishes an annual report on the state of infrastructure finance in Africa as well as other key studies in infrastructure finance.¹¹
- The AfDB launched the Africa50 Infrastructure Fund in 2013 as a platform to mobilize resources and support the development of key projects.¹² It is structured “as a development-oriented yet commercially-operated entity.”
- The Private Infrastructure Development Group (PIDG) was started in 2002 with European and Australian partnership as well as that of the World Bank.¹³ Its various “facilities” such as InfraCo Africa¹⁴ and The Emerging Africa Infrastructure Fund¹⁵ are designed to develop commercially viable projects and provide long-term finance to private sector infrastructure projects.
- In 2013, the United States launched its Power Africa initiative to mobilize investment and reform and enhance access to electricity.¹⁶ With government and private sector partners, this initiative is described as “a new model of development and diplomacy, aimed at advancing catalytic transactions, supporting policy reforms and improved governance and mobilizing financing to bring projects to fruition,” (Power Africa, 2014: 31).
- Most recently, in 2014 the World Bank launched the Global Infrastructure Fund (GIF) as a “platform” for identifying, preparing, and financing large complex infrastructure projects.¹⁷ This facility will thus also cover infrastructure financing in Africa.
- In addition, traditional bilateral and multilateral development flows to African infrastructure have increased overall, and there is a growing amount of non-traditional bilateral flows (from China, Brazil, and India). Finally, there are substantial opportunities from the establishment of a BRICS’ New Development Bank (BRICS Bank) and the Asia Infrastructure Investment Bank.¹⁸

While those initiatives, especially PIDA, show that progress has been made on the origination front through enhanced project preparation, the financing of infrastructure for regional projects has yet to materialize. Indeed, the recent Dakar Financing Summit¹⁹ did not yield the expected interest by institutional investors in spite of the readily available projects.

In the following, we argue that development banks should play a greater role in financing the construction phase of large regional projects given their expertise and flexibility in turn paving the way for institutional investors. Before we do so, we draw lessons from the literature on informed versus arm’s length debt.

III. Informed versus arm's length debt

An important strand of the finance literature focuses on the informational advantage that banks have over arm's length creditors. The bank first screens prospective clients and can later threaten to cut off credit. By doing so, banks provide the firm with the incentives to take the right investments. As a result of the diminished adverse selection and the reduced moral hazard, banks have the capacity to provide cheap "informed" funds as opposed to costly "uninformed" or arm's length funds. Banks can acquire information about the firm it is lending to in the course of the project but cannot easily communicate it to other investors.

Bank debt can easily be renegotiated because of the proximity with the creditor and short-term nature of the contracts. In contrast, arm's length creditors rely solely on public information. Because of the dispersion of arm's length debt holders and because any renegotiation suffers from information and free-rider problems, renegotiation is less likely than in the case of bank debt.

There are, however, costs to using bank debt. In his seminal paper, Rajan (1992) makes the case that, while informed banks are seemingly offering efficient contracts, growth firms often do not fully utilize banks to finance their projects.²⁰ This suggests that bank debt comes at a cost relative to other sources of financing. Rajan argues that informed banks will be able to control the owner's decision such that the project is continued only if it has positive net present value (NPV). Agarwal et al. (2008) argue that arm's length debt is less readily available but is cheaper because symmetrically informed lenders, which compete on the basis of public information, not only drive down its price but also restrict access to credit to minimize adverse selection, *ceteris paribus*. By contrast, better-informed inside lenders strategically use their information advantage to capture borrowers that pay higher rates but gain easier access to credit.

While that strand of literature is not specifically focused on the structure of financing of infrastructure, we argue that there are potentially important lessons to be drawn for the latter.

We now turn to the balancing act between development banking (informed debt) and (arm's length debt) long-term investing for the financing of Africa's infrastructure.

IV. From development banking to long-term investing

The main difficulty that Africa faces in terms of structuring its infrastructure finance is the balancing of differences in terms of investors' preferences (see Table 2). Considering the greenfield (hence more risky at the onset) nature of the infrastructure needs that Africa faces, development banks need to play a bigger role toward not just the origination but also the financing of the earlier stages of large infrastructure projects. They then need to operate a careful but prompt balancing act to promote the involvement of institutional investors in order to avoid crowding out those arm's length investors.

The focus here is on development financial institutions rather than regular commercial banks to support the early—and riskiest—phase of projects. In practice, a large share of the growth in infrastructure financing worldwide is currently shouldered by banks. Banks will surely remain an important source of financing, in particular in the early stages of new projects. However, banks have mostly short-term liabilities and are not well-placed to hold long-term assets on their balance sheets for an extended period of time. More stringent banking regulation following the global financial crisis including compliance with Basel III solvency and liquidity requirements has also further discouraged long-term lending by banks. As a result, development banks, which are not subject to the same regulatory constraints, need to step up and help with the early stages of the development of projects to pave the way for institutional investors such as SWFs, which constitute a viable source of financing for Africa's infrastructure.

Table 2. Phase of infrastructure projects

Phases	Risks	Investors
Planning	Renegotiation risk	Equity investors Informed lenders
Construction	Construction risk	Equity investors Informed lenders
Exploitation (early)	Demand risk (high)	Equity investors Informed lenders
Exploitation (mature phase)	Demand risk (low)	Equity investors Arm's length lenders

Source: Authors.

This is a delicate balancing act. Indeed, development banks should avoid crowding out the establishment of an infrastructure bond market—where long-term investors can play a key role—by staying invested for the long haul. The literature on PPPs stresses that one drawback of structuring PPPs by bundling construction and operation is that this generally involves a very long-term

contract, lasting over 25 to 40 years. Moreover, under such a contract the operator faces significant risk, both during the construction phase and in the operating phase. This calls again for a third party to intervene at the early phase of a project and development banks could play such a role. Development banks, because of their flexibility and expertise in infrastructure, can help with both on the origination front (project preparation) and financing.

Another rationale for the greater involvement of development banks in the early stage of projects is that in the absence of that engagement, institutional investors preferences would likely lead to a crowding out of greenfield infrastructure assets. Considering that Africa's infrastructure needs are mostly in greenfield investment, it is essential for development banks to step in at the earlier stage of the development of infrastructure projects. Indeed, most institutional investors are only comfortable holding debt instruments (bonds), preferably guaranteed, in relatively safe infrastructure assets, with as short as possible payback horizon. This generally means that private infrastructure investors crowd into the relatively safe *brownfield* infrastructure-asset class (that is, projects that are already built and operating), in which yields are no longer that attractive. Far fewer investors venture into *greenfield* infrastructure-projects (that is, projects that are still under development), which expose them to significant construction risk and involve much longer payback periods. Moreover, in the greenfield space, most private investors only want to hold senior, secured, and if possible, guaranteed debt.

Far fewer private investors venture into holdings of common equity stakes in greenfield projects because of their perception of high and different risks, especially for investors with limited expertise infrastructure project finance, which are most exposed to adverse selection.

Considering the differences in tolerance for risks of difference investors, their engagement should come at different stage of the infrastructure cycle. Clearly, development banks should engage at the earlier stage the infrastructure development cycle while institutional investors will come at the latter stage. Also, it should be noted that once development banks engagement into the greenfield space gathers pace in Africa, institutional investors can then come into the picture and support brownfield investment, which in turn would free up development banks to do more greenfield, and hence the virtuous cycle.²¹

Provided they uphold the highest standards, greater involvement of development banks could also help with the diffusion of best practices and hence reducing substantial efficiency gaps prevailing in existing infrastructure spending. Indeed, as argued by a recent IMF (2015) report, the economic and social impact of public investment critically depends on its efficiency. The report compares the value of public capital (input) and measures of infrastructure coverage and quality (output) across countries reveals average inefficiencies in public investment processes of around 30 percent using a large set of countries. This gap is likely higher in low-income countries where state capacity is

typically weaker. It concludes that “economic dividends from closing this efficiency gap are substantial: The most efficient public investors get twice the growth ‘bang’ for their public investment ‘buck’ than the least efficient.”

Once development banks’ investments in infrastructure mature and start generating cash flows, they will be able to attract institutional investors such as sovereign wealth funds and pension funds. However, appropriate investment tools will need to be made available to these investors. Publicly or privately placed securities can be used for this purpose. Indeed, domestic bond markets in Africa have grown in size over the past few years. IMF (2015) documents that frontier low-income countries including African countries have experienced significant increases in domestic debt in the recent years. Also, Mu et al. (2013) document that African bond markets have been steadily growing in recent years. Mu et al. (2013) find that government securities’ market capitalization is, for instance, directly related to better institutions and inversely related to the fiscal balance. They also find that corporate bond market capitalization is directly linked to economic size, the level of development of the economy and inversely related to higher interest rate spreads and current account openness. Sy (2010) documents that in the West African Economic Monetary Union (WAEMU) debt issuance has increased driven by the rapidly growing Treasury bills segment. He argues that the elimination of central bank financing of the government has been the catalyst of this growth while excess liquidity in the banking system has helped sustain the market. Sy (2010) also states that common institutions, such as a regional central bank and uniformity of issuance and distribution procedures have led to high cross-border transactions. The WAEMU sovereign bond market has reached 10.5 percent of GDP in 2014 from 3.8 percent in 2009.

The ultimate goal for Africa should be to have a continent-wide infrastructure bond market. The development of a deep and liquid infrastructure bond market in Africa necessitates a strong legal and regulatory framework. With support from multilateral institutions such as the African Legal Support Facility, a common legal framework could be envisioned for regional infrastructure projects. Such a framework could serve as a common legal base for country-specific projects.²² This is in line with the recommendations made in the context of the various working groups set up by the African Financial Markets Initiative (AFMI). The initiative is aimed at contributing to capital market development in Africa and is focused on a cooperative approach with public and private sector partners seeking to increase the available financing options to the African corporate sector and to act as a catalyst for regional market integration.

Some infrastructure projects have been financed in offshore corporate bond markets, which have had the depth and liquidity to provide large sums at long maturities for specific sectors. Such financing is accessible when the country has a high sovereign rating, especially when this reflects a credible legal framework, political stability, and a reasonably efficient bureaucracy. Eventually, it is, of course, most appropriate to finance infrastructure projects in a deep and liquid onshore corporate

bond market. In that case, the sovereign ceiling on credit ratings would be less of a constraint and currency risk would not be an issue. This requires solid legal frameworks in the host countries including the development of a rating system. In the specific case of Africa, the adoption of regional or at least sub-regional systems would facilitate the potential regulatory hurdles for investors to have to deal with disparate legal and regulatory framework. The rapid development of infrastructure in Latin America in the past decades can certainly constitute an interesting benchmark for Africa (see Arca, 2013).

Institutional investors can use a number of channels to invest in infrastructure. Direct exposure is gained mainly through the unlisted equity instruments (direct investment in projects and infrastructure funds) and project bonds while indirect exposure is normally associated with listed equity and corporate debt.²³ More specifically, pension funds can rely on a number of options, such as:

- **Listed infrastructure companies:** investment in equity of companies that are exposed to infrastructure.
- **Infrastructure funds:** investment in publicly listed equity funds trading on a stock exchange or in un-listed equity funds that focus on infrastructure investments.
- **Direct investment** (or co-investment along infrastructure funds): investment in equity of a single-asset project company, or a portfolio of infrastructure assets that provide diversification among geographies and sectors.
- **Debt financing:** lending to the owner or operators of the infrastructure, for instance through project bonds or general obligation bonds.

Institutional investment—mainly by pension funds—in Africa has taken a number of different routes. South Africa has the largest variety of instruments available to institutional investors, and pension funds have invested in infrastructure using project finance loans for toll roads, municipal bonds, and jointly owned infrastructure funds. Pension funds in other countries have favored instruments such as corporate bonds (Cape Verde, Uganda, Mozambique) and government bonds earmarked for infrastructure financing (Kenya, Senegal, Ghana) as well as state bonds and government-sponsored infrastructure funds (Nigeria), regional funds (Ghana's Social Security and National Insurance Trust, SSNIT), and infrastructure funds (Nigeria Infrastructure Fund); (see Inderst and Stewart (2014)). In addition, the listing of an infrastructure bond on the domestic stock exchange is under consideration in Namibia.

Mbeng Mezui and Hundal (2013) also note the issuance of bonds to invest in infrastructure with limited exposure to project risk by the central government in Kenya (with tax incentives to investors); parastatals in South Africa, Kenya, and Namibia, and sub-sovereign issuers in Nigeria and South

Africa, whereas corporate infrastructure issuers are mainly from the telecommunications sector. Pension funds directly participate in infrastructure investment through loans and private placements in South Africa and in the East African Community.

Interestingly, project bonds, which are well-suited to finance the infrastructure sector and have been used in Asia and Latin America, have seldom been used to attract African (and foreign) institutional investors. Unlike bonds issued by African governments, which have a promise (but not an obligation) to invest in infrastructure and are paid out of fiscal revenues, infrastructure project bonds are repaid from cash generated by a specific project (such as a toll road).

Beyond domestic options, instruments are also being developed at the regional level. The proposed African Infrastructure Development Fund (the Africa50 Fund) seeks to leverage co-financing from pension funds as well as from a wide range of investors, including the African Development Bank, other regional banks, private equity funds, sovereign wealth funds, private sector investors, and international investors (NEPAD and UNECA, 2014). Other initiatives to spur regional infrastructure have also been developed by multilateral institutions such as the East African Development Bank (EADB). At the global level, the World Bank Group, including the International Finance Corporation (IFC) are also supportive of infrastructure investment. Going forward, arrangements, including co-financing by domestic pension funds and multilateral institutions as well as private and bilateral investors, could provide an efficient pooling of resources. At the global level, the OECD (2014a) indicates that global pension funds are taking different approaches to infrastructure investing. Of the 35 surveyed funds that specifically indicated investment in infrastructure assets, 28 reported exposure to unlisted infrastructure assets, while 14 had dedicated target allocations to the asset category. Of the total \$70.3 billion allocated to unlisted infrastructure, a subset of funds broke down their allocation into direct investments and managed funds. In this sample, unlisted infrastructure funds accounted for 29 percent of the total, direct and co-direct investments, 68 percent, and other unlisted investments, 3 percent. Direct investment remained the most common method for funds to gain exposure to infrastructure, especially among large funds that have the size and expertise for direct investments. Debt exposure to infrastructure was \$9.7 billion or 0.4 percent of total assets in 2013. The debt category may contain publicly traded debt instruments or direct project loans, senior and/or mezzanine loans, and bonds.

V. Conclusions

This paper explored the appropriate financing structure of infrastructure investment in Africa. The existing financing structure of infrastructure in Africa is not commensurate to Africa's needs and is concentrated in specific sectors such as telecommunications and energy. New initiatives, including PIDA, have the ambition to scale up infrastructure investment in Africa but mainly reveal progress on the origination front as opposed to the financing one. Considering differences in investors' preferences, this paper argued that Africa's success in filling its largely greenfield (and hence risky) infrastructure gap hinges upon a delicate balancing act between development banking and long-term institutional investing. First, greater involvement of development banks, which have both the flexibility and expertise in these projects, should help finance the riskier phase of large infrastructure projects. Second, development banks should disengage and offload their debts to pave the way for a viable engagement of long term-investors such as sovereign wealth funds and other long-term investors. In order to promote an Africa-wide infrastructure bond markets where the latter could play a critical role, the enhancement of Africa's legal and regulatory framework should, however, start now.

References

- Agarwal Sumit & Robert Hauswald, 2008. "The choice between arm's-length and relationship debt: evidence from e-loans," Working Paper Series WP-08-10, Federal Reserve Bank of Chicago.
- Armendáriz de Aghion, B. 1999. "Development Banking" *Journal of Development Economics* 58: 83-100.
- Arca, Emil. 2013. "The Future of Project Bonds in Latin America" *Harvard Business Law Review Online*.
- Arezki, R, P. Bolton, S. Peters, F. Samama and J. Stiglitz. 2015. "From Global Savings Glut to Financing Infrastructure: The Advent of Investment Platforms" mimeo.
- Clark, G.L., Monk, A., Orr, R. and Scott, W. (2012) *The New Era of Infrastructure Investing*. *Pensions*, 17: 103-111
- Ehlers, Torsten, Frank Packer and Eli Remolona. *Infrastructure and Corporate Bond Markets in Asia*. Conference Volume. Bank of International Settlement.
- Inderst, Georg and Fiona Stewa. 2014. *Institutional Investment in Infrastructure in Emerging Markets and Developing Economies*. PPIAF. The World Bank Group.
- Gutman, Jeffrey, Amadou Sy, Soumya Chattopadhyay. 2015. *Financing African Infrastructure: Can the World Deliver?*. Brookings Institution.
- Hauswald, R. and R. Marquez (2006), "Competition and Strategic Information Acquisition in Credit Markets," *Review of Financial Studies* 19: 967-1000.
- Holmstrom, Bengt and Jean Tirole, 1998. "Private and Public Supply of Liquidity," *Journal of Political Economy*, University of Chicago Press, vol. 106(1), pages 1-40, February.
- Inderst, R. and H. Müller (2006), "A Lender-Based Theory of Collateral," forthcoming *Journal of Financial Economics*.
- Inderst Georg and Fiona Stewart (2014). "Institutional Investment in Infrastructure in Emerging Markets and Developing Economies, March, PPIAF, World Bank
- International Monetary Fund (2015), "Making Public Investment More Efficient" Washington, DC.
- International Monetary Fund (2015). "Public Debt Vulnerabilities in Low-Income Countries: The Evolving Landscape". Staff report, International Monetary Fund, December.

- Iossa, Elisabetta and David Martimort, 2012. "Risk allocation and the costs and benefits of public-private partnerships," *RAND Journal of Economics*, RAND Corporation, vol. 43(3), pages 442-474, 09.
- Martimort, David , Flavio Menezes, Myrna Wooders and Elisabetta Iossa, 2015. "The Simple Microeconomics of Public-Private Partnerships," *Journal of Public Economic Theory*, Association for Public Economic Theory, vol. 17(1), pages 4-48, 02.
- Mu, Yibin, Peter Phelps, and Janet G. Stotsky (2013). "Bond Markets in Africa", International Monetary Fund No. 13/12.
- Eduardo, Engel, Fischer, Ronald, Galetovic, Alexander, 2008. "The Basic Public Finance of Public-Private Partnerships," Working Papers 35, Yale University, Department of Economics.
- Martimort, David and Pouyet, Jerome, 2008. "To build or not to build: Normative and positive theories of public-private partnerships," *International Journal of Industrial Organization*, Elsevier, vol. 26(2), pages 393-411, March.
- McKinsey Global Institute, 2013. Infrastructure productivity: How to save \$1 trillion a year. http://www.mckinsey.com/insights/engineering_construction/infrastructure_productivity
- Mirrlees, J A, 1999. "The Theory of Moral Hazard and Unobservable Behaviour: Part I," *Review of Economic Studies*, Wiley Blackwell, vol. 66(1), pages 3-21, January.
- OECD (2011) Pension Funds Investment in Infrastructure: A Survey.
- Rajan, R. G. (1992), Insiders and Outsiders: The Choice between Informed and Arm's-Length Debt. *The Journal of Finance*, 47: 1367–1400.
- Sy, Amadou (2010). "Government Securities Markets in the West African Economic and Monetary Union: A Review," *African Development Review*, African Development Bank, vol. 22(2), pages 292-302.
- TheCityUK (2013), "Sovereign Wealth Funds," *Financial Markets Series*, March 2013.
- Vickers, John, and George Yarrow. 1991. "Economic Perspectives on Privatization." *Journal of Economic Perspectives*, 5(2): 111-132.
- World Bank. 1980. *The World Bank Annual Report 1980*. Washington, DC. <http://documents.worldbank.org/curated/en/1980/01/438421/world-bank-annual-report-1980>.

- World Bank. 1994. *World Development Report 1994: Infrastructure for Development*. Washington, DC: The World Bank/Oxford University Press.
- World Bank. 2011. *Handbook on Infrastructure Statistics*. Washington, DC. http://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/AfDB%20Infrastructure_web.pdf
- World Bank. 2013a. *Harnessing Urbanization to End Poverty and Boost Prosperity in Africa: An Action Agenda for Transformation*. Washington, DC. <http://documents.worldbank.org/curated/en/2013/09/18417628/harnessing-urbanization-end-poverty-boost-prosperity-africa-action-agenda-transformation>
- World Bank. 2013b. "Infrastructure Policy Unit: 2012 Global PPI Data Update." Washington, DC. <http://ppi.worldbank.org/features/August-2013/PPI%202012%20Globo%20Update%20Note%20Final.pdf>
- World Bank. 2013c. "Comparison of the International Instruments on Public Procurement." Background Paper, *Review of the World Bank's Procurement Policies and Procedures*. Washington, DC., March.
- World Bank. 2013d. "Procurement in World Bank Investment Project Finance Phase I: A Proposed New Framework." Washington, DC., October.
- World Bank. 2014. "2013 Private Participation in Infrastructure Global Update." Washington, DC. <http://ppi.worldbank.org/features/Dec2014/2013-Global-PPI-Update.pdf>
- World Bank. "World Bank Guarantee Program." Washington, DC. <http://web.worldbank.org/external/default/main?menuPK=64143540&pagePK=64143532&piPK=64143559&theSitePK=3985219>
- Yepes, Tito, Justin Pierce, and Vivien Foster. 2008. "Making Sense of Sub-Saharan Africa's Infrastructure Endowment: A Benchmarking Approach." *Working Paper 1*, Africa Infrastructure Country Diagnostic. Washington, DC: World Bank.

Endnotes

1. According to a recent study by McKinsey Global Institute (2013), global demand for funding of infrastructure investments is expected to reach as much as \$57 trillion by 2030.
2. See <http://viewer.zmags.com/publication/53289bac#/53289bac/2>.
3. See also Ehlers (2014), Clark et al. (2012) and OECD (2011) for an overview of the obstacles pension funds face when investing into infrastructure.
4. <http://www.oecd.org/daf/fin/private-pensions/G20-OECD-Principles-LTI-Financing.pdf>.
5. This section draws extensively from Gutman, Sy, and Chattopadhyay (2015).
6. For details on the Program for Infrastructure Development in Africa (PIDA) of the African Development Bank (AfDB), see <http://www.afdb.org/en/topics-and-sectors/initiatives-partnerships/programme-for-infrastructure-development-in-africa-pida/>.
7. For details on the New Partnership for Africa's Development (NEPAD) at the African Union (AU), see <http://www.nepad.org/about>.
8. The list is as follows: Northern Corridor; Mombasa to great lakes region through Nairobi & Kampala ; Mombasa – Nairobi – Addis (MNA) Corridor ; Lamu Corridor: New Lamu Port to Juba, Eastern DRC and to Addis ; Central Corridor: Dar-es-Salaam to the great lakes region ; Kenya – Tanzania Highway ; North – South Corridor: port of Durban to Copperbelt in DR Congo and Zambia; Abidjan-Lagos Corridor ; Abidjan-Ouagadougou/Bamako Corridor.
9. For details on Africa Infrastructure Country Diagnostic (AICD), see World Bank (2011).
10. For details on the Infrastructure Consortium for Africa (ICA) of the AfDB, see <http://www.icafrica.org/en/about-ica/>.
11. See ICA Annual Reports: ICA (2013) and ICA (2014a).
12. For details on the Africa50 Infrastructure Fund, African Development Bank, see <http://www.afdb.org/en/topics-and-sectors/initiatives-partnerships/africa50-infrastructure-fund/>.
13. For details on the Private Infrastructure Development Group (PIDA), see <http://www.pidg.org/what-we-do>.
14. For details on InfraCo, see <http://www.infracoafrica.com/>.
15. For details on Emerging Africa Fund, see <http://www.emergingafricafund.com/>.

16. For details on Power Africa, USAID, see <http://www.usaid.gov/powerafrica>.
17. For details on GIF (World Bank), see <http://www.worldbank.org/en/topic/publicprivatepartnerships/brief/global-infrastructure-facility>.
18. This includes official development flows from Brazil, Turkey, Russia, as well as consortiums such as Arab Fund for Economic and Social Development, Islamic Development Bank, Abu Dhabi Fund for Development, Arab Bank for Development in Africa, and Saudi Fund for Development, among others.
19. <http://www.dakar-nepadsummit.org>.
20. See Inderst and Muller, 2006, and Hauswald and Marquez, 2006 for more recent references.
21. This shift is akin to what we have seen with the Islamic Development Bank through the development of sukuk, a type of Islamic securities which offer investors a stream of income based on the cash flows generated by a real asset (such as rental income). There is also an interesting parallel with the listing of securities offering income derived from the revenues of toll roads.
22. See <http://www.afdb.org/en/topics-and-sectors/initiatives-partnerships/african-legal-support-facility/>.
23. See OECD (2014).

